REMARKS

In response to the Office Action of October 19, 2004, claims 29 and 33 have been amended such that the heat-exchange concaves for promoting heat-exchange under increased pressure have a depth in a range from 1 to less than 20 µm, i.e. not including 20 µm.

In the Response to Amendment on page 4 of the Action, it was held that "In the viscous region above a pressure of 1 Torr, for a smaller gap heat transfer coefficient is higher. Therefore, from the point of heat transfer small gap would be desired."

However, in Mountsier, dot height corresponding to heat-exchange concave of the invention is less than 40 µm, preferable 20-35 µm (column 10, lines 64-66). It does not mean that the dot height is preferably as small as possible. Thus, it is considered that the range from 1 to less than 20 µm of the invention is a range not preferable in Mountsier.

In the present invention, the range which is deemed not preferable in Mountsier is positively used. The reason of the difference is that while Mountsier does not consider the moving distance of molecules contributing to heat transfer, the present invention considers the moving distance of molecules.

As explained in paragraph 0027 of the specification, if molecules must move for a long distance for heat transfer, heat transfer efficiency decreases. This reason relates to mean-free path. In order to increase the heat transfer efficiency, molecules reach the stage from the substrate without colliding with other molecules.

For example, in cooling the substrate, it is most efficient in case heated molecules by contacting the substrate reach the stage directly to provide heat to the stage to be cooled without colliding with other molecules. If in the middle of the movement, the heated molecules collide with other molecules, the collided molecules are heated by the heat transfer from the heated

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molecules. Even if the collided molecules thus heated reach the substrate, since the collided molecules are not so low in temperature, the cooling efficiency is not so high. The theory is substantially the same in heating.

Of course, if the pressure is high, for example in a viscous region as stated in the Action, the absolute amount of molecules in contributing the heat transfer is large, so that the heat transfer rate is increased without relating to the above problem. However, the pressure of the substrate at the rear side, i.e. the pressure at the heat-exchange concave, can not be increased so high. Thus, since the front side of the substrate is in a vacuum condition, if the pressure at the heat-exchange concave is made high, the substrate may float or project from the stage, or leakage of gas for heat-exchange is increased. In case the pressure in the heat-exchange concave is 10 Torr, since the number of molecules in contributing the heat transfer is small, if the distance is long, the heat transfer efficiency due to collision of molecules is worsened. Namely, collision of molecules is increased, so that heat transfer efficiency is decreased. Thus, the heat exchange concave is preferably less than 20 µm.

In comparing with the invention, in Mountsier, the distance between the stage and the substrate, i.e. dot height, is relatively made large to 20-35 µm, to which large number of molecules is sent. In the present invention, in considering the problems, such as floating of the substrate and gas leakage, the amount of molecules to be sent is made small, i.e. pressure is low, and the distance or depth of the heat-exchange concave is made in the range from 1 µm to less than 20 µm. Thus, the present invention is not obvious from Mountsier.

Incidentally, it was held in the Response to Amendment that the depth is 5-100 µm, but this is the width (column 7, line 32), not depth.

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Other cited references do not disclose or suggest the specific features of the invention.
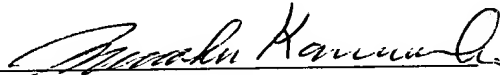
As explained above, the present invention is patentable over the cited references.

Reconsideration and allowance are earnestly solicited.

One month extension of time is hereby requested. A credit card authorization form in the amount of $120.00 is attached herewith for the one month extension of time.

Respectfully Submitted,

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